Thesis/
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Northern Region Landbird Monitoring Program

NORTHERN REGION LANDBIRD MONITORING PROGRAM

USFS Region 1 contract #57-0343-5-00012
Second Report

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Plum Creek Timber Company (check #191090)
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Executive Summary

Overview. This report includes a series of first-generation habitat-relationships models for a variety of songbird species that were detected on point counts conducted in association with the Northern Region Migratory Songbird Monitoring Program (under support from an earlier USFS contract, #53-0343-2-00207). The models include information on probabilities of occurrence within each of a series of major cover types. Models were built under the working assumption that probabilities of occurrence are constant within patches of a given cover type, regardless of the landscape context. Second-generation models, which will include refinements based on additional local- and landscape-level variables are forthcoming.

Summary of principal results. Based on a single year's field effort across all 13 forests, we detected a total of 186 bird species, including 14 waterfowl species, 19 raptor species, 8 shorebird species, and 8 game bird species (Table 1). Most of the species (137) included those that the point count method was designed to detect--songbirds (loosely defined as doves through sparrows). I have attached information on the geographic and habitat distribution patterns for most (108) of the songbird species; it should be clear that the detail and region-specific nature of this information can be matched by no other database in existence. **None of the species herein are threatened or endangered; thus, there is a chance to use the information in a proactive manner to avoid future wildlife conflicts that might result from land-use decisions.** Some results from this initial analysis can already provide clear guidance for land-use decisions that involve input from wildlife biologists. Other results merely suggest potential problems that may be festering, and that are worthy of additional attention.

Specifically, a number of bird species are restricted in their habitat distribution to each of the following: (1) post-fire, standing-dead forests, (2) relatively uncut, older forests, (3) marshes, (4) riparian bottomlands, (5) upland riparian stream environments, and (6) grassland and/or sagebrush. Simply put, the loss any one of these cover types will mean the loss of those bird species that are relatively restricted to it. Thus, the question becomes one of how much of each to maintain on the landscape. A second question involves whether the bird species can tolerate highly managed forms of each type. Bird species restricted to the first three types can probably withstand much less disturbance than bird species restricted to the latter three types. Another series of bird species occurs commonly in agricultural fields, prompting the question of whether farming activities are compatible with nesting success. Still another set of species occurs commonly in harvested conifer forests, which is of management interest because the harvested forests are "unnatural" in the sense that details of their structure (e.g., widely, or evenly-spaced live trees) do not exist under natural conditions. This is a potential problem because unnatural cover types may elicit settling responses by species that are "programmed" to respond to a superficially similar, but fundamentally different, cover type. Thus, it becomes imperative that we determine whether these unnatural cover types are acting as **"ecological traps"**, where species are being attracted to sites where suitability (in terms of reproductive success and or adult survival) is poor because food resources, predation, or parasitism rates are unnaturally high.

Notes on Methods

Combining cover types. Our original Northern Rocky Mountain cover type descriptions

included 241 possible types (see the Field Methods handbook submitted as part of the final report under contract #53-0343-2-00207). For the purposes of this report, these were combined into 18 types, and most of the combinations involved data from the various post-harvest treatments. Specifically, data from each of four harvest treatments (clearcuts, seed-tree cuts, shelterwood cuts, and group-selection cuts) and post-fire conditions were combined across forest types into five "disturbance" categories. Within each of these five disturbance categories, I also combined all four temporal stages of post-harvest development from the early, low-shrub stage to the later, tall-shrub stage. Finally, the "young", "mature", and "old-growth" stages under each forest type were combined into a single (relatively undisturbed) category for each forest type. Thus, for conifer forest types, we ended up with 11 categories represented by six relatively mature and closed-canopy forest types (ponderosa pine through spruce-fir forests) and five early-successional or post-treatment types (post-fire, clearcut, seed-tree cut, shelterwood cut, and group-selection cut).

A review of cover type descriptions. Each of the condensed cover types has one or more photographs associated with descriptions provided in the Northern Rocky Mountain Cover Type Manual (which was also submitted as part of the final report under contract #53-0343-2-00207). Nonetheless, I provide a brief description of each below:

Residential--this type includes both urban and rural residential areas. The key here is that the sample point falls within an area that contains man-made structures, open spaces resulting from forest clearing, and (generally) non-native vegetation.

Agricultural land--this type includes both irrigated and dry cropland. The key here is that the vegetation represents a monoculture in comparison with a native grassland.

Grassland--this includes short-, mid-, and tall-grass prairie types. We further subdivided this type into relatively heavily grazed and relatively ungrazed, but the grazing intensities were subsequently not distinguished because observers from eastern Montana and North Dakota failed to record that distinction in 1994.

Sagebrush--this type is dominated by its namesake, although native grasses and junipers may have been present. It includes both heavily grazed and relatively ungrazed subgroups.

Ponderosa pine--at least 80% of the canopy cover in this type was comprised of its namesake, and it included young, mature, and old-growth stages. The more mature stages may have been selectively logged,but the canopy was still relatively closed (in comparison with the harvested types described below).

Douglas-fir--at least 80% of the canopy cover in this type was comprised of its namesake, and it included young, mature, and old-growth stages. The more mature stages may have been selectively logged, but the canopy was still relatively closed (in comparison with the harvested types described below).

Mixed-conifer--except for a few points that fell within fairly pure larch forest, no single

conifer species made up more than 80% of the canopy cover in this forest type. As with the preceding two types, this category included young, mature, and old-growth stages. The more mature stages may have been selectively logged, but the canopy was still relatively closed (in comparison with the harvested types described below).

Cedar-hemlock--at least 80% of the canopy cover in this type was comprised of the combination of cedar, hemlock, and/or grand fir, and it included young, mature, and old-growth stages. The more mature stages may have been selectively logged, but the canopy was still relatively closed (in comparison with the harvested types described below).

Lodgepole--at least 80% of the canopy cover in this type was comprised of its namesake, and it included young, mature, and old-growth stages. The more mature stages may have been selectively logged, but the canopy was still relatively closed (in comparison with the harvested types described below).

Spruce-fir--at least 80% of the canopy cover in this type was comprised of a combination of spruce and fir species or high-elevation whitebark/limber pine. The type includes forests in young, mature, and old-growth stages. The more mature stages may have been selectively logged, but the canopy was still relatively closed (in comparison with the harvested types described below).

Group selection--this type includes forest stands wherein clusters of trees were removed, leaving the appearance of clusters of trees with large open-spaces in between. Physiognomically, this type includes stands in the earliest post-harvest successional stage (with shrub and seedling development still below 1 meter in height) up to the pole-sapling stage (with trees up to about 10-cm dbh). A relatively small proportion (< 5%) of this type was comprised of what were fairly pure stands of one of the conifer species designated above; most of the pre-treatment stands were mixed-conifer stands.

Shelterwood--this type includes forest stands within which a relatively large percentage (perhaps 80%) of trees had been removed so that a series of uniformly-spaced, large trees were left to provide shade for regenerating seedlings. These stands take on an orchard-like appearance because of the uniform spacing of overstory trees, and are in and early to mid-succession post-harvest stage of stand development.

Seed tree--this type includes forest stands wherein most trees were removed and a few widely spaced (generally fairly mature) trees were left to act as a seed source.
Clearcut--this type includes forest stands within which nearly all trees have been removed; only snags or a smattering of (generally small) trees remain. This type is similar to the post-fire category except that there are numerous standing dead trees in the "natural" post-fire situation.

Post-fire--this type was comprised of forest stands that had experienced a relatively intense stand-replacement crown fire, as evidenced by the presence of numerous blackened, standing-dead trees. I included data from my 1989-1990 post-fire studies.

Marsh, wetland--this riparian type includes areas with standing water that supported either short-statured marsh or meadow vegetation, or willow flats.

Riparian shrub--this type includes areas that have a well developed but narrow riparian vegetation component (e.g., alder, maple, willow) along relatively fast-moving streams.

Riparian bottomland/aspen--this riparian type includes aspen stands and streamside areas that generally contain an abundant cottonwood canopy cover. Points from hardwood draws in eastern Montana and North Dakota were included in this type as well.

Model building protocol. The process of building a habitat distribution model for a given species included the following steps: (1) I looked at its distribution across the Region to see if the species was restricted to a subset of the entire area. If so, I looked at whether the resulting pattern of habitat use was strongly biased by the inclusion of points from outside the normal range of the species. No obvious problems emerged; (2) I looked at the influence of time-of-day on detection probability and excluded data from time period extremes if the detection probabilities were exceptionally high or low; (3) I did the same as in number 2 for time-of-season; (4) For the non-riparian cover types, I excluded points that were positioned within 100 m from the edge of another major cover type. That way, I excluded points where at least some of the birds were certainly detected in a cover type that was other than that recorded as present at the census point. I had to include data from **all** points positioned within each of the three riparian types (marsh, riparian shrub, and riparian bottomland) because most of those points were within 100 m of another cover type--those cover types are less expansive, edge types by definition. Thus, the number of points used to calculate the probabilities of occurrence across cover types (4200) was substantially less than the number actually conducted in the field (9091).

Even if the cover type was homogeneous within a 100-m radius around the observer, some birds were still detected more than 100 m away, and they could have been in cover types that differed from the single cover type recorded at a given census point. To "purify" the samples even further, I could have eliminated all bird detections beyond, say, 30 m, but as a compromise between knowing that bird detections came from within the cover type of interest and having as large a sample size as possible, I used detections that occurred within 100 m of the observer. Thus, probabilities of occurrence are associated with relatively homogeneous areas.
Which species are included in the modeling effort? Several published studies suggest that a species should be detected on about 50 point counts before initiating a model-building effort, and 98 species met that criterion. I have appended models for each of those species plus 10 additional species that did not meet the sample size criterion, but that illustrate potential management issues nonetheless.

Summary of principal results.

1. Based on a single year's field effort across all 13 forests, the monitoring program has produced a wealth of knowledge about the geographic and habitat distribution of an amazing number of bird species. We detected a total of 186 bird species, 137 of which were species that

the point count method was designed to detect--songbirds (loosely defined as doves through sparrows). We also detected 14 waterfowl species, 19 raptor species, 8 shorebird species, and 8 game bird species (Table 1). Geographic and habitat distribution patterns for most (108) of the 137 songbird species are included in this report.

2. The detail and region-specific nature of this information can be matched by no other database in existence. Yes, some patterns of habitat use were already common knowledge (e.g., Grasshopper Sparrow is restricted to grasslands, or Brewer's Sparrow is restricted to sagebrush), but other patterns of restricted distribution were not as evident prior to this work (e.g., Black-backed Woodpecker to burned forests, or Brown Creeper to relatively uncut cedar-hemlock forsts). More importantly, prior to this survey, we had no knowledge of the relative abundance of the more widespread species across cover types, especially harvested forest types. It is now evident that Orange-crowned Warbler and Solitary Vireo, for example, occur not only broadly across forest types, but most commonly in harvested forest types, and that Williamson's Sapsucker is even relatively restricted to such types! This kind of information is available nowhere else.

3. Results from this report can already provide clear guidance for land-use decisions that involve input from wildlife biologists. For example, a number of bird species are relatively restricted in their habitat distribution to each of the following (species that best illustrate a given distribution pattern are highlighted in **bold** lettering): (a) post-fire, standing-dead forests, (e.g., **Black-backed Woodpecker**, Cassin's Finch, Clark's Nutcracker, Hairy Woodpecker, House Wren, Lincoln's Sparrow, Mountain Bluebird, Olive-sided Flycatcher, Pine Siskin, Ruby-crownded Kinglet, Tree Swallow, Three-toed Woodpecker, Western Wood-Pewee); (b) relatively uncut, older forests (e.g., **Brown Creeper**, Chestnut-backed Chickadee, Golden-crowned Kinglet, Gray Jay, Hammond's Flycatcher, Hermit Thrush, Mountain Chickadee, Pine Grosbeak, Pileated Woodpecker, Red-breasted Nuthatch, Townsend's Warbler, Varied Thrush, Winter Wren); (c) marshes (e.g, Common Snipe, **Common Yellowthroat**, [Marsh Wren], Red-winged Blackbird, [Yellow-headed Blackbird]); (d) riparian bottomlands (e.g., American Goldfinch, American Redstart, Belted Kingfisher, Black-capped Chickadee, [Bank Swallow], Cedar Waxwing, Gray Catbitd, Lazuli Bunting, **Least Flycatcher**, Northern Waterthrush, Ovenbird, Red-eyed Vireo, Song Sparrow, Tree Swallow, Veery, Western Wood-Pewee, Willow Flycatcher, Yellow-breasted Chat, Yellow Warbler); (e) upland riparian stream environments (e.g., **American Dipper**, Lincoln's Sparrow, Wilson's Warbler); (f) grassland and/or sagebrush (e.g., Baird's Sparrow, Brewer's Sparrow, Chestnut-collared Longspur, Clay-colored Sparrow, Common Nighthawk, Field Sparrow, Grasshopper Sparrow, Horned Lark, Lark Sparrow, **Sprague's Pipit**, Vesper Sparrow, Western Meadowlark); and (g) agricultural fields (e.g., **Bobolink**, Savannah Sparrow, Vesper Sparrow, Western Meadowlark). Obviously, the loss any one of these cover types will mean the loss of those bird species that are relatively restricted to it. Thus, it's clear that we need to maintain each of those elements on the broader landscape, although it's unclear how much of each needs to be retained to maintain viable populations.

4. Even if we are not about to lose a given cover type from the broader landscape, land use practices within and around that type may have important implications, especially for species restricted to that cover type. For example,

a) **Bird species relatively restricted to early post-fire situations**.--salvage logging will have a negative impact on species that are either restricted to, or relatively restricted to, early post-fire conditions. Such distribution patterns result from the fact that those wildlife species depend to a great extent on standing dead trees in burned forests for feeding and/or nesting purposes. The presence of such narrowly distributed habitat specialists leaves little doubt that post-fire salvage cutting activities are in direct conflict with the needs of these bird species.

b) **Bird species restricted to relatively uncut, older forests**.--Based on observed distribution patterns, the cutting (even light thinning) of dense, older forests (especially the cedar-hemlock type) will have negative effects on several species that are restricted to those conditions. To assure the maintenance of their populations, we probably need to maintain relatively large patches of older forest types on the landscape.

c) **Bird species restricted to marshlands.**--The draining and conversion of wetlands will have negative effects on species restricted to those conditions. Because our methods were not well designed to survey birds that occupy this cover type, we did not detect additional species that are known to fall into this category.

d) **Bird species restricted to riparian bottomlands**.--Numerous songbird species are relatively restricted to riparian bottomlands. This fact takes on special meaning when we consider that bottomland riparian cover types make up less than 0.5% of all land area, and that they incur a disproportionate amount of human activity (i.e., home building, recreation, and livestock grazing) and cowbird activity. Much of this land base is private, making publicly-owned land of this type much more important as refuges for wildlife that might be sensitive to the human activities outlined above. We currently lack, but desperately need, information on cowbird parasitism rates in relation to the presence of livestock in riparian bottomlands, and we need information on the effects of vegetation alteration and livestock presence on nesting success of our riparian bottomland birds.

e) **Bird species restricted to upland riparian stream environments.**--These species may be especially sensitive to so-called "best management practices", which have never been evaluated in terms of their effects on a wide variety of riparian-dependent terrestrial wildlife species.

f) **Birds restricted to grassland and sagebrush environments**.--If we couple the fact that many species are restricted to grassland, sagebrush, or a combination of both, with the fact that many of the same species are declining on a nation-wide scale, the management of those lands becomes an issue. We cannot comment on the effects of grazing until the 1995 data have been incorporated into the database, but this is a common land-use activity on grassland and shrubsteppe environments that may be incompatible with the needs of some of these bird species.

g) **Birds that occur commonly in agricultural fields.**--Several species occur commonly in (and in some cases are nearly restricted to) agricultural fields during the breeding season. The main issue here is one of whether mechanical disturbance from farm

machinery interferes with the reproductive biology of these species. If so, these environments may be acting as "ecological traps" that attract the species, but don't allow them to be successful there.

5. Most conifer-forest birds are distributed broadly across forest types, and many occur relatively commonly in variously cut forests (e.g., American Kestrel, Black-headed Grosbeak, Chipping Sparrow, Dusky Flycatcher, Hairy Woodpecker, House Wren, MacGillivray's Warbler, Mountain Bluebird, Northern Flicker, Orange-crowned Warbler, Rufous Hummingbird, Steller's Jay, Swainson's Thrush, Townsend's Solitaire, Warbling Vireo, Western Tanager, **Williamson's Sapsucker**, Yellow-rumped Warbler). This probably means that, except for those species restricted to older, relatively uncut forests, we can modify forest lands to an extent and still retain conditions necessary for most forest birds. The potential management issue that still looms is related to the fact that harvested forests are "unnatural" in the sense that their structure consists of combinations of elements (widely, or evenly-spaced live trees) that simply do not exist in natural successional seres. The problem is that these unnatural cover types may elicit settling responses by species that are "programmed" to respond to superficially similar, but fundamentally different, early successional forest types. Thus, it becomes imperative that we determine whether these unnatural forest types are acting as **"ecological traps"**, where species are being attracted to areas where suitability (in terms of reproductive success and or adult survival) is poor because food resources, predation, or parasitism rates are unnaturally high there. Because no forest bird species is **restricted** to harvested conditions, there will always be a "backup" of lightly harvested or unharvested forest as a refuge from such a potential problem, should it exist. Although we need data on nest success to be sure, I suspect that most bird species do well in harvested forests. Moreover, if our abundance data reflect suitability of cover types, we have improved conditions for most forest bird species through timber harvesting activities.

Who can answer questions you may have? I am available through regular mail (given on p. 1), e-mail (given on p. 1), and the phone (use 406-243-4292 to leave a message).

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who, as you will be able to judge for yourself, did a great job collecting the point-count data. From 1992-1994, these were J. Adams, J. Balcomb, J. Barilla, D. Bergeron, A. Bosma, D. Casey, C. Couch, C. Cutler, J. Dodge, R. Fergus, J. Gallagher, T. Grunder, D. Harvey, P. Heglund, S. Henderson, P. Hendricks, J. Hoffland, E. Loomis, G. Mazer, J. McBride, T. Mears, D. Miller, M. Mitchell, M. Munts, B. Pitman, S. Ritter, S. Reel, J. Ross, J. Slotterback, C. Snetsinger, B. Thompson, S. Winsor, and J. Young.

Table 1. Measures of abundance for each of the bird species detected on point counts conducted in the Northern Region.

Species	No. points	Percent	No. individs	Mean #/point
No. point counts	9091	100.00		
Dark-eyed Junco	4434	48.77	7486	.823
Yellow-rumped Warbler	3290	36.19	4451	.490
Red-breasted Nuthatch	3268	35.95	4559	.501
Pine Siskin	2908	31.99	6701	.737
Chipping Sparrow	2852	31.37	4375	.481
American Robin	2802	30.82	4097	.451
Swainson's Thrush	2796	30.76	4580	.504
Western Tanager	2392	26.31	3051	.336
Ruby-crowned Kinglet	2312	25.43	3270	.360
MacGillivray's Warbler	2108	23.19	2824	.311
Townsend's Warbler	1948	21.43	2999	.330
Warbling Vireo	1692	18.61	2298	.253
Mountain Chickadee	1648	18.13	2320	.255
Northern Flicker	1347	14.82	1563	.172
Golden-crowned Kinglet	1235	13.58	1824	.201
Dusky Flycatcher	1179	12.97	1521	.167
Brown-headed Cowbird	1124	12.36	1691	.186
Red Crossbill	1087	11.96	4676	.514
Solitary Vireo	1036	11.40	1162	.128
Western Meadowlark	1005	11.05	2494	.274

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Townsend's Solitaire	1003	11.03	1163
.128			
Vesper Sparrow	999	10.99	2012
.221			
Varied Thrush	931	10.24	1206
.133			
Common Raven	927	10.20	1143
.126			
Hammond's Flycatcher	711	7.82	866
.095			
Orange-crowned Warbler	705	7.75	839
.092			
Rufous-sided Towhee	607	6.68	1090
.120			
Winter Wren	582	6.40	661
.073			
Clark's Nutcracker	581	6.39	859
.094			
Mountain Bluebird	573	6.30	894
.098			
Olive-sided Flycatcher	559	6.15	615
.068			
Gray Jay	546	6.01	800
.088			
Yellow Warbler	534	5.87	707
.078			
Song Sparrow	531	5.84	716
.079			
House Wren	530	5.83	693
.076			
Field Sparrow	482	5.30	763
.084			
Red-naped Sapsucker	469	5.16	539
.059			
Evening Grosbeak	456	5.02	1233
.136			
Hermit Thrush	449	4.94	565
.062			
Lazuli Bunting	449	4.94	617
.068			
Black-capped Chickadee	447	4.92	630
.069			
Cassin's Finch	405	4.45	557
.061			
Hairy Woodpecker	394	4.33	454
.050			
Mourning Dove	390	4.29	540
.059			
Grasshopper Sparrow	322	3.54	544
.060			
Pileated Woodpecker	320	3.52	336
.037			
Fox Sparrow	309	3.40	398
.044			
Horned Lark	291	3.20	572
.063			

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Steller's Jay	283	3.11	355
.039			
White-crowned Sparrow	263	2.89	380
.042			
Chestnut-backed Chickadee	259	2.85	552
.061			
American Crow	246	2.71	415
.046			
Common Yellowthroat	245	2.69	335
.037			
Tree Swallow	239	2.63	531
.058			
Ruffed Grouse	235	2.58	239
.026			
Red-tailed Hawk	234	2.57	263
.029			
Wilson's Warbler	234	2.57	301
.033			
Black-headed Grosbeak	228	2.51	246
.027			
Western Wood-Pewee	217	2.39	255
.028			
Northern Waterthrush	200	2.20	242
.027			
Red-winged Blackbird	178	1.96	451
.050			
Willow Flycatcher	176	1.94	229
.025			
Lark Sparrow	175	1.92	315
.035			
Rufous Hummingbird	167	1.84	200
.022			
Cedar Waxwing	160	1.76	331
.036			
American Redstart	158	1.74	184
.020			
Savannah Sparrow	158	1.74	311
.034			
Lincoln's Sparrow	157	1.73	209
.023			
European Starling	153	1.68	780
.086			
Brewer's Blackbird	146	1.61	375
.041			
Yellow-breasted Chat	139	1.53	154
.017			
Eastern Kingbird	133	1.46	197
.022			
Nashville Warbler	131	1.44	145
.016			
Common Snipe	126	1.39	163
.018			
Sprague's Pipit	121	1.33	160
.018			
Rock Wren	120	1.32	149
.016			

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American Kestrel	115	1.26	126
.014			
Calliope Hummingbird	115	1.26	121
.013			
Red-eyed Vireo	111	1.22	126
.014			
Three-Toed Woodpecker	110	1.21	126
.014			
Cordilleran Flycatcher	108	1.19	130
.014			
Black-billed Magpie	104	1.14	158
.017			
Brewer's Sparrow	103	1.13	194
.021			
American Goldfinch	103	1.13	141
.016			
Killdeer	99	1.09	131
.014			
Ring-necked Pheasant	96	1.06	99
.011			
Barn Swallow	92	1.01	181
.020			
Brown Creeper	88	.97	111
.012			
Williamson's Sapsucker	84	.92	97
.011			
Ovenbird	80	.88	100
.011			
Green-tailed Towhee	80	.88	113
.012			
Cliff Swallow	71	.78	456
.050			
Pine Grosbeak	71	.78	93
.010			
White-breasted Nuthatch	68	.75	87
.010			
House Finch	63	.69	186
.020			
Clay-colored Sparrow	54	.59	65
.007			
Belted Kingfisher	53	.58	56
.006			
Downy Woodpecker	51	.56	52
.006			
Baird's Sparrow	50	.55	70
.008			
Common Nighthawk	48	.53	58
.006			
Upland Sandpiper	45	.49	48
.005			
Gray Catbird	45	.49	51
.006			
Vaux's Swift	41	.45	89
.010			
Black-backed Woodpecker	39	.43	44
.005			

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Lark Bunting	38	.42	91
.010			
Sandhill Crane	37	.41	65
.007			
Northern Harrier	35	.38	43
.005			
House Sparrow	35	.38	79
.009			
N. Rough-winged Swallow	34	.37	71
.008			
Spotted Sandpiper	33	.36	38
.004			
American Dipper	32	.35	37
.004			
Great Blue Heron	31	.34	33
.004			
Say's Phoebe	31	.34	34
.004			
Violet-green Swallow	30	.33	52
.006			
Osprey	29	.32	36
.004			
Mallard	28	.31	60
.007			
Brown Thrasher	28	.31	31
.003			
Western Kingbird	27	.30	38
.004			
Blue Grouse	25	.27	30
.003			
Rock Dove	25	.27	85
.009			
Bobolink	25	.27	38
.004			
Northern Goshawk	24	.26	28
.003			
Canada Goose	23	.25	143
.016			
Veery	22	.24	25
.003			
Sharp-shinned Hawk	21	.23	21
.002			
Sharp-tailed Grouse	21	.23	55
.006			
Least Flycatcher	21	.23	27
.003			
Northern Oriole	21	.23	32
.004			
Cooper's Hawk	20	.22	22
.002			
Black-and-white Warbler	20	.22	20
.002			
Turkey Vulture	18	.20	29
.003			
Long-billed Curlew	17	.19	24
.003			

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Yellow-headed Blackbird	15	.16	50
.005			
Wild Turkey	14	.15	24
.003			
Chestnut-collared Longspur	12	.13	32
.004			
Western Bluebird	11	.12	14
.002			
Common Grackle	11	.12	30
.003			
White-throated Swift	10	.11	25
.003			
Swainson's Hawk	9	.10	10
.001			
Lewis' Woodpecker	9	.10	9
.001			
Common Merganser	8	.09	13
.001			
Bank Swallow	8	.09	38
.004			
American White Pelican	7	.08	79
.009			
American Pipit	7	.08	13
.001			
Spruce Grouse	6	.07	6
.001			
Eastern Bluebird	6	.07	6
.001			
White-winged Crossbill	6	.07	12
.001			
Sora	5	.05	5
.001			
Northern Pygmy-Owl	5	.05	5
.001			
Barred Owl	5	.05	8
.001			
Broad-tailed Hummingbird	5	.05	5
.001			
Common Loon	4	.04	4
.000			
Double-crested Cormorant	4	.04	6
.001			
Barrow's Goldeneye	4	.04	7
.001			
Golden Eagle	4	.04	5
.001			
Great Horned Owl	4	.04	6
.001			
Pygmy Nuthatch	4	.04	19
.002			
Loggerhead Shrike	4	.04	6
.001			
Wood Duck	3	.03	5
.001			
American Wigeon	3	.03	6
.001			

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Bald Eagle	3	.03	3
.000			
California Quail	3	.03	3
.000			
Short-eared Owl	3	.03	3
.000			
Black-chinned Hummingbird	3	.03	3
.000			
Marsh Wren	3	.03	4
.000			
Blue-winged Teal	2	.02	2
.000			
Cinnamon Teal	2	.02	6
.001			
Gadwall	2	.02	3
.000			
Flammulated Owl	2	.02	2
.000			
Red-headed Woodpecker	2	.02	2
.000			
Boreal Chickadee	2	.02	3
.000			
Canyon Wren	2	.02	2
.000			
Northern Shoveler	1	.01	2
.000			
Hooded Merganser	1	.01	1
.000			
Prairie Falcon	1	.01	1
.000			
Gray Partridge	1	.01	2
.000			
Solitary Sandpiper	1	.01	1
.000			
Burrowing Owl	1	.01	1
.000			
Great Gray Owl	1	.01	2
.000			
Northern Saw-whet Owl	1	.01	1
.000			
Black Swift	1	.01	2
.000			
Yellow-bellied Sapsucker	1	.01	1
.000			
Sage Thrasher	1	.01	1
.000			
Tennessee Warbler	1	.01	1
.000			
Blackpoll Warbler	1	.01	1
.000			
Mourning Warbler	1	.01	1
.000			

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